The Challenges of Pest Control in Intensively-Managed Forest Plantations

David R. Coyle

USDA Forest Service, Southern Research Station
New Ellenton, SC 29809

Why Create Forest Plantations?

Phytoremediation

Carbon sequestration

CRP Plantings

Pulpwood and sawtimber

There are different levels of plantation management

Plant and leave (minimal)

“Brown Earth” policy (intensive)

Intensive management in forest plantations employs tactics similar to traditional agricultural crops

- Site Preparation
- Weed control
- Pest control

- Irrigation
- Fertilization

Management strategies include a combination of chemical (synthetic and biorational) and silvicultural methods.

Economic Injury Level is different for research plantations compared to commercial plantations.

Expected versus unexpected pests

- Expected pests
  - Common and/or well documented
  - Known and established control measures
  - Relatively easy to control

Expected versus unexpected pests

- Unexpected pests
  - Pests uncommon in general or in a particular crop
  - Information may be sparse regarding life history
  - Control measures either unknown entirely or for a particular crop

Forest plantation pest management

A case study in South Carolina

- 55 acre tree plantation
- Cottonwood (two clones), sycamore, sweetgum, and loblolly pine
- Irrigation, Fertilization, I+F, control
- Primary purpose is for above and belowground tree physiology research

Expected Pest: Nantucket pine tip moth

Rhyacionia frustrana

- Life history, damage, and control measures are well documented
- Degree-day model available for SC (Fettig et al. 2000)
- Synthetic chemical treatments were made according to the model
- Effective control was achieved

Expected pest: Cottonwood leaf beetle

Chrysomela scripta

- Life history, damage, and control measures are well documented
- Susceptible life stages and effective biorational controls have been identified (Coyle et al. 2000)
- Effective control was achieved

Unexpected Pest: Cottonwood leafcurl mite

Aculops lobuliferus

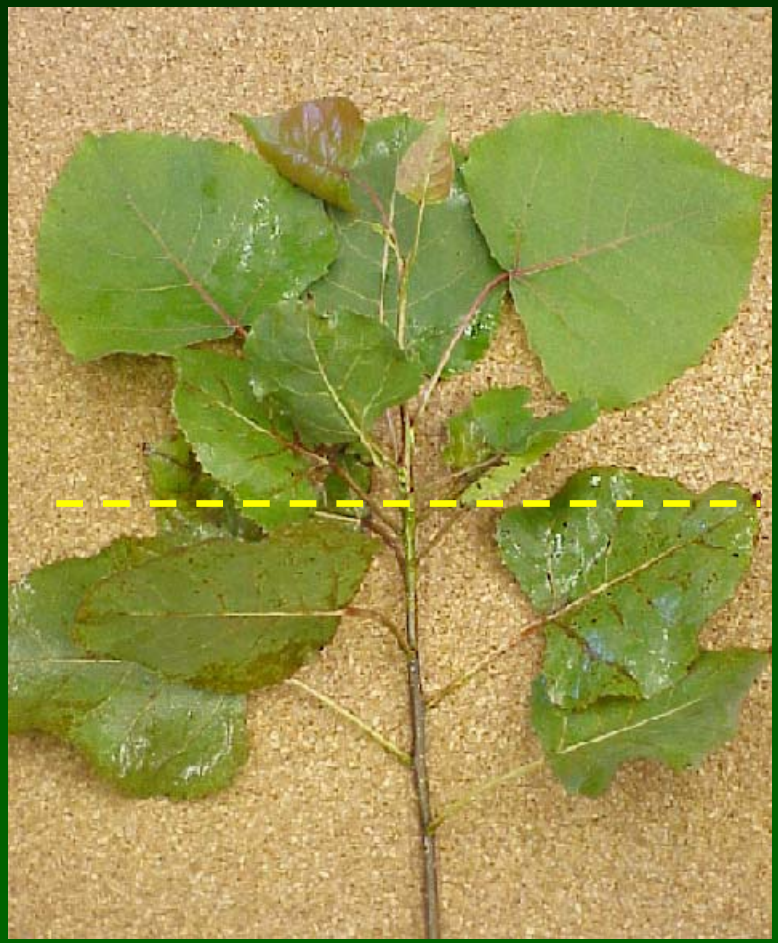
- Resembles yellow dust on leaves
- Feed primarily on LPI 0-12
- Can cause leaf malformation, premature leaf abscission, reduced growth, terminal and tree mortality
- Populations intensified by warm, dry weather (= South Carolina for up to 5 mo./yr)

Effects of clone, miticide, and silvicultural treatment on CLM damage

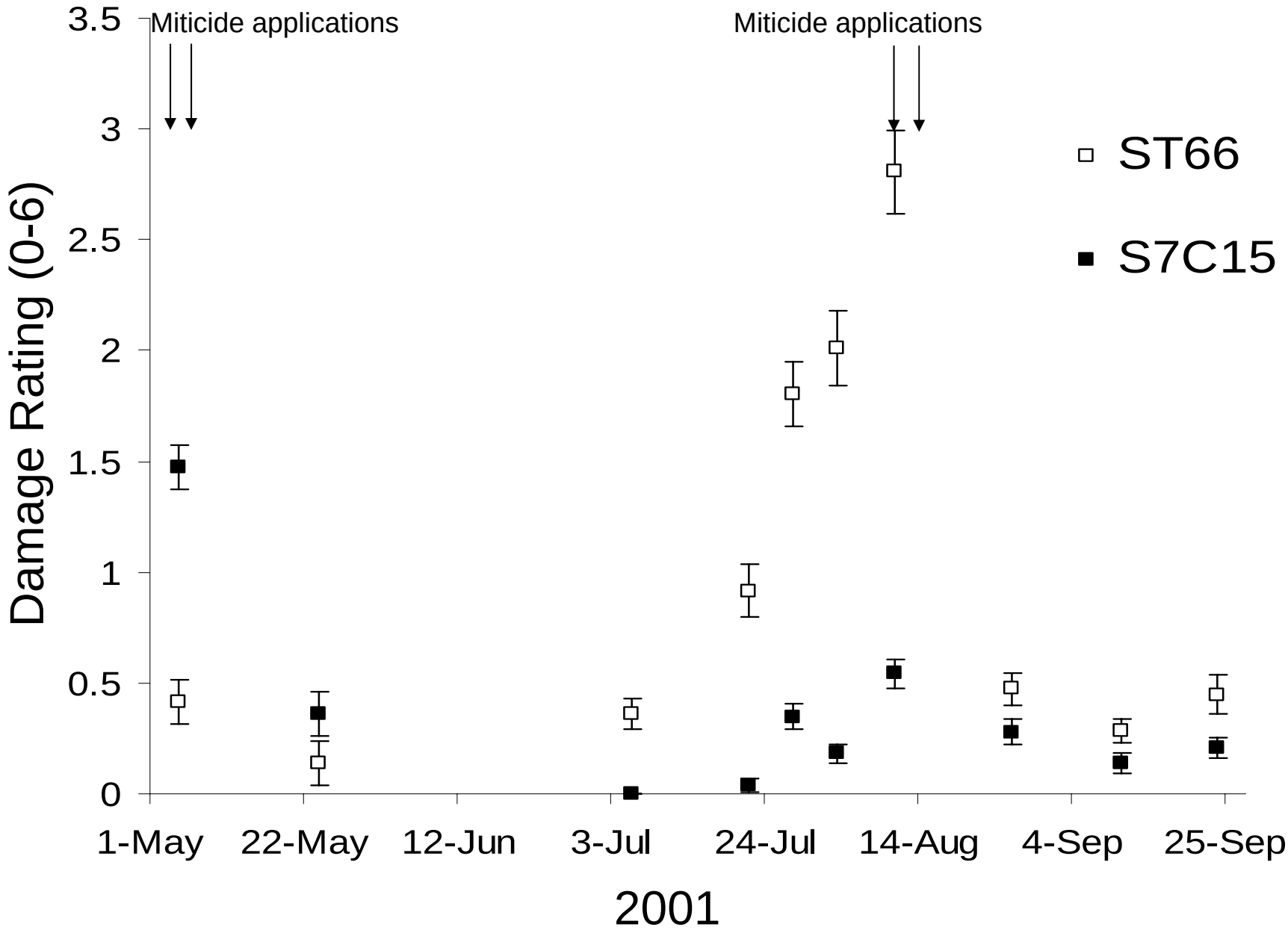
Coyle. 2002. Environ. Entomol. 31: *In Press*.

- Terminal mortality (from CLM damage in 2000) was quantified in May 2001
- CLM populations monitored throughout 2001
- Efficacy of two miticide applications in 2001 was measured

After treatment



Before treatment


Miticide applications
Miticide applications
ST66
S7C15
Damage Rating (0-6)
3.5
3
2.5
2
1.5
1
0.5
0
1-May
22-May
12-Jun
3-Jul
24-Jul
14-Aug
4-Sep
25-Sep
2001

Unexpected Pest:
Ambrosia beetles (Coleoptera: Scolytidae)

Xylosandrus crassiculus

3 additional species identified thus far

- First noticed in early spring 2002
- Lower trunks of both cottonwoods had a burned appearance from exudates
- Sooty mold grew on trunks as a result of beetle attacks

Ambrosia beetle monitoring and management plan

- Four Lindgren funnel traps were installed at the corners of the plantation and were baited with ethanol lures
- Traps are checked weekly to detect emergence of future broods

Ambrosia beetle management strategies

- Chemical control - Astro (permethrin), Merit (imidacloprid) and Talstar (bifenthrin) have been used with success
- Apply to the lower stem area
- Timing is critical!

Developing Tools to Solve the Challenges of Tomorrow

The Challenge:

Controlling pests in forest plantations located on different sites, having different purposes, and with different control requirements.

Developing Tools to Solve the Challenges of Tomorrow

The Tools:

Laboratory and field level research

Rapid, widespread communication

Acknowledgements

- Research and support made possible by the Short Rotation Woody Crops Cooperative Research Program, USDA Forest Service, Southern Research Station.

- Collaborators from UGA, USFS, Bartlett Tree Research Laboratories assisted with NPTM and Ambrosia beetle activities.